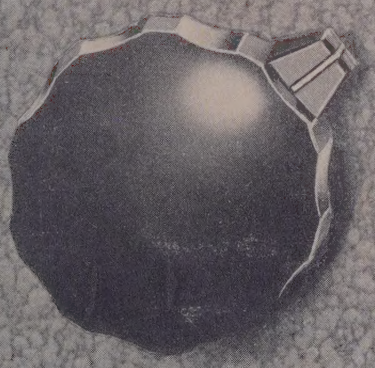
first in Performance Reliability and Quality

Kepco INSTRUCTION MANUAL

RETURN TO
ENGINEERING
SYS. DIVISION

VRPS*



* VOLTAGE REGULATED POWER SUPPLIES

Kepco

NO. 1

RETURN TO
ENVIRONMENTAL TEST
76-18 B/104

RETURN TO
SYS. ENGINEERING LAB.
SPACE SYS. DIVISION

MODEL KM-253

SERIAL NO. B14723

KEPCO, INC.
131 - 38 Sanford Avenue
Flushing 55, New York

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Flushing, New York

KEPCO, INC.
131 - 38 Sanford Avenue
Flushing 55, New York

MAGNETIC-TUBELESS

VOLTAGE REGULATED POWER SUPPLY

MODEL KM-253

SPECIFICATIONS:

OUTPUT VOLTAGE DC: 20-60 volts continuously variable.

OUTPUT CURRENT DC: In the range 20-40 volts, 0-6 amperes continuous duty. In the range 40-60 volts, 240 volt-amperes continuous duty (the product of the output voltage and the output current cannot exceed 240 volt-amperes.)

REGULATION: In the range 20-60 volts the output voltage variation is less than ±1% for line fluctuation from 100-130 volts. Control on front panel can be set to optimize the load regulation ~~and~~ at any given output voltage to within ±1% for load variations from 0 to maximum current.

RIPPLE VOLTAGE: Less than 30 millivolts RMS.

FUSE PROTECTION: Input fuse on front panel.

OVERLOAD PROTECTION: An automatic current limiting device allows direct shorting of the output terminals without damage to the supply.

POWER REQUIREMENTS: 100-130 volts, 60 cycles.

OUTPUT TERMINATIONS: DC terminals are clearly marked on the front panel. Either positive or negative terminal of the supply may be grounded. DC terminals are isolated from the chassis. A terminal is available for connecting to the chassis. All terminals are also brought out at the rear of the chassis. A barrier strip is mounted at the rear of the chassis to

provide for picking up the error signal directly at the load. This connection compensates for the voltage drop in the wires connecting the power supply to the load.

METERS: Ammeter: 0-6 amperes, 2-1/2" wide view.

Voltmeter: 0-60 volts, 2-1/2" wide view.

CONTROLS: Power on-off switch, DC voltage control, and load regulation control are mounted on the front panel.

PHYSICAL SPECIFICATIONS: Rack panel construction. Panel height 7", width 19", depth 13", color Kepco standard gray hammertone. This unit is designed for relay rack mounting or bench use. Carrying handles are provided.

OPERATIONAL CHARACTERISTICS: This regulated unit consists of a KEPCO FLUX-O-TRAN line regulator followed by a magnetic amplifier regulator. The FLUX-O-TRAN line regulator furnishes well regulated transient free AC power to the power unit. The high gain magnetic amplifier is used to regulate the DC output voltage to compensate for voltage changes in the power unit for varying load currents. The response time for pulse loads is less than 0.3 second.

OPERATING INSTRUCTIONS: This Magnetic-Tubeless Voltage Regulated Power Supply is shipped without any internal packing material and may be put into operation immediately.

PROCEDURE FOR TURNING ON THE POWER SUPPLY:

The remote error signal jumper bars which are located on the barrier strip at the rear of the chassis should be locked in position. These jumper bars

should not be opened while the power supply is in operation. Turn on the power switch. Adjust the DC voltage control to the desired output voltage.

PROCEDURE FOR OPERATION OF THE POWER SUPPLY FOR NON-REMOTE ERROR SIGNAL:

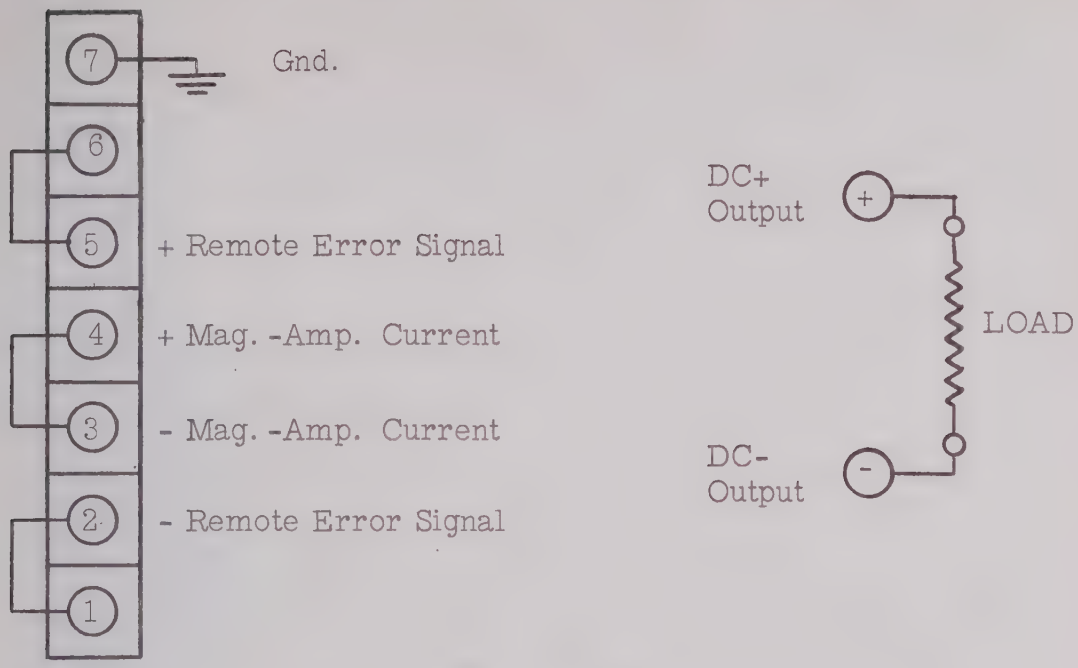
The remote error signal terminals are located on a barrier strip at the rear of the upper chassis. For non-remote error signal there are two jumper bars connected from the + and - remote error signal terminals to adjacent terminals on the barrier strip. (See Figure I.)

PROCEDURE FOR OPERATING THE POWER SUPPLY FOR REMOTE ERROR SIGNAL:

With the power supply turned off, remove the jumper bars from the remote error signal terminals located on the barrier strip. Use twisted pair wire for connecting the + and - output terminals from the rear of the chassis to the load. Use another set of twisted pair wires connecting the + and - remote error signal terminals to the load contacts. (See Figure I.)

OVERLOAD PROTECTION DEVICE: The automatic current limiting device in this unit is a circuit breaker with a relay trip coil. This circuit breaker is also the power on-off switch. The relay trip coil is in series with the output voltage terminal. When the current through the relay trip coil exceeds 9 amperes the power on-off circuit breaker is tripped off. The circuit breaker cannot be reset until the overload condition is removed.

NON-REMOTE ERROR SIGNAL CONNECTION



REMOTE ERROR SIGNAL CONNECTION

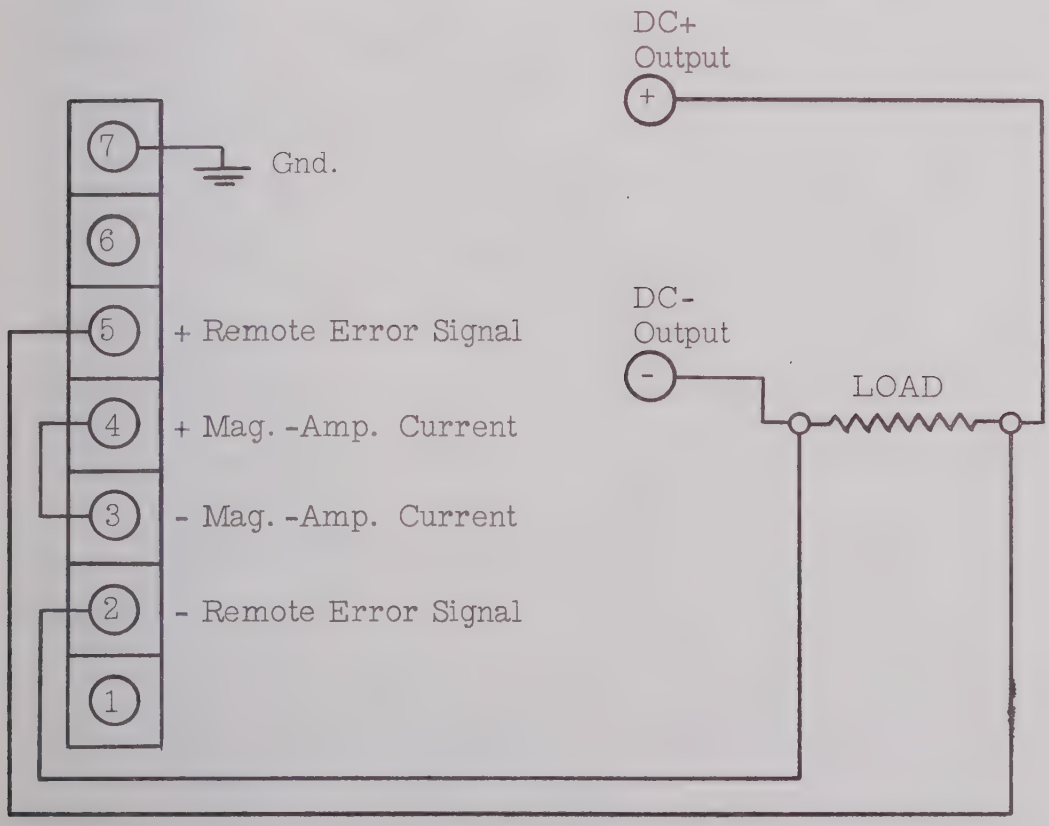


FIGURE I.

LOAD REGULATION ADJUSTMENT: A load regulation adjustment potentiometer is provided on the front panel which enables adjustment for almost perfect load regulation at one particular output voltage setting. This control has been set at the factory so that almost perfect load regulation is obtained at 40 volts.

When perfect load regulation is desired at any output voltage other than 40 volts, the procedure for perfect load regulation adjustment is as follows:

1. Loosen the locking nut on the potentiometer labelled LOAD COMP.
2. Set the voltage control to the desired output voltage.
3. Vary the load from 0-maximum. If the output voltage drops when the load is applied, the load regulation circuit is under-compensating. In this event, slowly turn the LOAD COMP. potentiometer clockwise until the output voltage is returned to the no-load voltage.

   If the output voltage increases when the load is applied, the load regulation circuit is over-compensating. In this event, slowly turn the LOAD COMP. potentiometer counter-clockwise until the output voltage is returned to the no-load voltage.
4. Tighten the locking nut on the LOAD COMP. potentiometer.

MAG.-AMP. TEST POINTS: Two terminals are provided on a barrier strip located on the rear apron of the chassis labelled "3" and "4". These two terminals are connected with a jumper bar for normal operation of the power supply. In the event that any difficulties are encountered with the Mag.-Amp. regulator, a 50 milliamperes low resistance DC ammeter can be connected in place of the jumper bar. For normal operation of the

Mag.-Amp. this current should be within approximately 5 to 15 milliamperes throughout the entire operating range.

PROCEDURE FOR SETTING THE HIGH AND LOW LIMIT MAG.-AMPLIFIER TRACKING CONTROLS:

Two controls are provided on the chassis for setting the Mag.-Amp. current for the high and low voltage limits of this supply. These two controls are adjusted and locked at the factory so that the Mag.-Amp. current throughout the operating voltage range, 20 to 60 volts, is held approximately constant (5 to 15 milliamperes). These controls should not have to be reset unless components in the voltage control assembly or reference assembly are replaced. When such changes are required and the regulation is not within specification throughout the operating voltage range, 20 to 60 volts, these controls will have to be readjusted. The following procedure is to be used when adjustments of these controls are necessary:

1. Remove the jumper across the Mag.-Amp. test points terminals 3 and 4 of the barrier strip on the rear apron of the chassis, and connect the 0-50 milliamperes DC meter across these two terminals (3 neg., 4 pos.).
2. Without any load across the output terminals turn the supply on and slowly turn the voltage control knob through the voltage range, 20 to 60 volts, and observe the Mag.-Amp. current. The milliammeter reading should not change appreciably through the entire range except for the initial transient as the control knob is turned. The Mag.-Amp. current should be within approximately 5 to 15

milliamperes through the entire operating range. If there is a marked change in the Mag.-Amp. current throughout the range, the Mag.-Amp. current High and Low adjustment potentiometers need to be reset.

3. Loosen the locking nuts on the potentiometers labelled HIGH and LOW. These potentiometers are located on the chassis directly below the rear of the voltage control assembly.
4. Set the output voltage at 20 volts and adjust the LOW potentiometer until the Mag.-Amp. current reads approximately 10 milliamperes. Clockwise rotation increases the current.
5. Reset the output voltage to 60 volts. If the Mag.-Amp. current is considerably different than 10 milliamperes, adjust the HIGH potentiometer until the Mag.-Amp. current is approximately 10 milliamperes. Clockwise rotation increases the current.
6. Reset the output voltage back to 20 volts. If the Mag.-Amp. current is different than 10 milliamperes, repeat above steps 4 and 5. It may be necessary to repeat steps 4 and 5 two or three times in order to obtain the best Mag.-Amp. current adjustment.

   The absolute value of the Mag.-Amp. current may differ from Mag.-Amp. to Mag.-Amp. It will always be within the range of approximately 5 to 15 milliamperes.
7. When these adjustments are completed, tighten the locking nuts on the High and Low potentiometers, remove the Mag.-Amp. meter, and replace the jumper bar across terminals 3 and 4.

NOTE: The output voltage range of this unit goes below 20 volts and above 60 volts. However, the Mag. -Amp. current may not be constant beyond the 20 and 60 volts limits. The power supply may be operated outside the limits 20 to 60 volts although the regulation may be out of specification.

PROCEDURE FOR SETTING CONTROLS COUPLED TO POWERSTAT:

In the event that the controls coupled to the Powerstat or other controls in the voltage divider network are replaced, the procedure for setting these controls is as follows:

1. Loosen the set screws on the two flexible couplings on the voltage control assembly. Turn the Powerstat and the two variable resistors counter-clockwise to their minimum positions. Tighten the set screws on the flexible couplings.
2. The Mag. -Amp. current High and Low limit controls may have to be readjusted when the above adjustments are made. Follow procedure outlined above for checking the Mag. -Amp. current.

MAINTENANCE:

The components of this Magnetic-Tubeless Voltage Regulated Power Supply have been selected and tested to provide long and trouble-free operating life.

REPAIRS:

Should any trouble develop in the instrument, it may be serviced with the aid of the schematic diagram. Major repairs, however, are usually handled by the factory.

Under no circumstances should the instrument be returned to the factory without proper authorization and shipping instructions. In any correspondence with the factory concerning repairs, the type and serial number of the instrument must be given together with a description of the trouble encountered.

PARTS LIST - MODEL KM-253

DRAWING S-KM-253-01

C1	- 3	MF	236 V AC
C2	- 100	MF	450 WV
C201	- 4250	MF	75 WV
C202	- 4250	MF	75 WV
**C203	- 6	MF	660 V AC
**C204	- 3	MF	660 V AC
C205	- 0.1	MF	500 WV
CB101	- Circuit Breaker 9 Amp.		
CR1 thru CR4	- Germanium Rectifier 1N92		
CR201	- Silicon Rectifier 508C539H02		
CR202	- Silicon Rectifier 1R203D1S1		
F101	- 8 Amp. Fuse		
L1	- Kepco Filter Choke #100-1113		
L201	- Kepco Filter Choke #100-1128		
L202	- Kepco Filter Choke #100-1128		
M101	- Meter, 0-6 A DC		
M102	- Meter, 0-60 V DC		
MA201	- Kepco Magnetic Amplifier #100-1069		
PL101	- Neon Pilot Light NE-51		
R101	- 10	Ohm	3 watt WW Pot.
R201	- 60	Ohm	3 watt WW Pot.
R202	- 300	Ohm	3 watt WW Pot.
R203	- 15	Ohm	55 watt WW
R204	- 0.02	Ohm	Kepco Resistor
R205	- 80	Ohm	50 watt Rheostat
R206	- 10	Ohm	20 watt

**C203 and C204 are matched to T201

PARTS LIST - MODEL KM-253

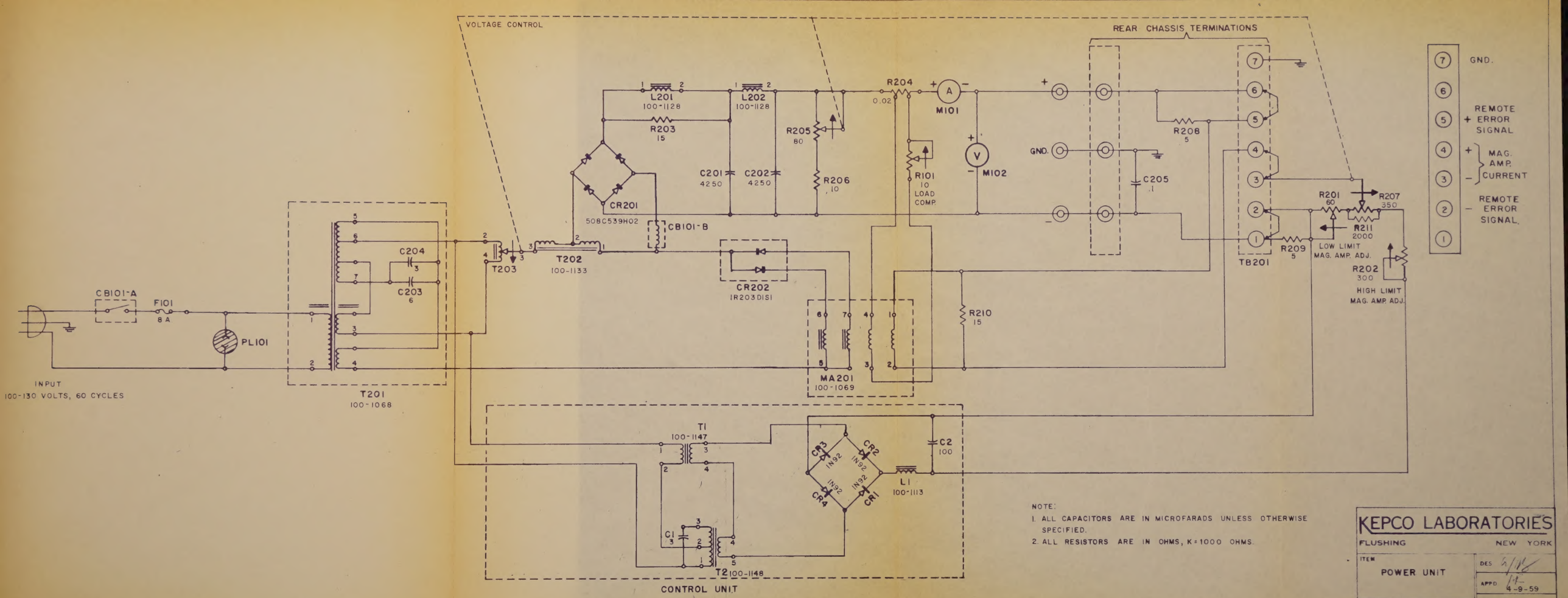
DRAWING S-KM-253-01

R207	- 350	Ohm	25 watt Pot.
R208	- 5	Ohm	3 watt WW
R209	- 5	Ohm	3 watt WW
R210	- 15	Ohm	1 watt (Value determined by MA201)
R211	- 2	K	20 watt WW

T1 - Kepco Transformer #100-1148
T2 - Kepco Transformer #100-1147

T201 - Kepco Flux-O-Tran #100-1068
T202 - Kepco Transformer #100-1133
T203 - Powerstat, Superior Type 20

TB201 - Jones #7-140-Y



NOTE:
1. ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
2. ALL RESISTORS ARE IN OHMS, K=1000 OHMS.

KEPCO LABORATORIES
FLUSHING NEW YORK

ITEM: POWER UNIT	DES 5/18
	APPD 4-9-59
MODEL KM253	DFTM A.A.L.
DWG No S-KM253-01	CHKD E.S.C.

first in
Performance
Reliability
and Quality
Kepco